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ENHANCING AGRO-INDUSTRY FOR PRODUCTIVE AND DECENT WORK FOR YOUTH AND WOMEN IN UGANDA:

THE CASE FOR FISH AND COTTON VALUE CHAINS

SYNTHESIS PAPER

Madina M. Guloba, Elizabeth A. Birabwa, Swaibu Mbowa, and Rehema Kahunde

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ABSTRACT

This study uses desk reviews, secondary data, and qualitative (Barazas forums and key informants) approaches to answer questions on the nature of jobs (old and potential), skills and technology requirements and investment opportunities in two critical value chains of fish and cotton. In addition, the study explores the extent to which the prevailing environment within each sector is conducive to facilitating the growth of these value chains. Of note is that the fish value chain is heterogeneous depending on the fish variety. In this study, we place emphasis on three lucrative fish varieties, i.e., Silver fish (*mukene*), Nile Perch (*mpuuta*) and Tilapia (*ngege*).

About fish, findings reveal that Lake Victoria alone had the number of fishermen doubling from 34,889 to over 60,000 between 2000 and 2020. Over 99 percent of persons involved in the fish business (irrespective of fish type) are males (both young and adults). Beyond the fishing /production stage, more women are involved in local processing (sun drying, salting and deep frying) of silver fish compared to Nile Perch and Tilapia. Women and youth take part in the Nile Perch and Tilapia processing chain by smoking and salting the bones after removing the fillet. The Nile Perch (*Mpuuta*) value chain is more complex, highly industrialised and capital-intensive because of the *fish maw.* In the Tilapia value chain, the share of men and women engaged in production has grown by 14 percent between 2014 and 2020, attributed to the uptake of cutting-edge technologies in fish farming (aquaculture). Findings also highlighted the relatively low skills required by persons willing to participate in the value chains. Amongst the various opportunities for investment in the fish value chain are adding value to the fish maw, investing in more quality control measures to ensure and foster standards given that fish is highly perishable and susceptible to toxins if not well handled, manufacturing sustainable fishing gear, e.g., nets, hooks and baits, fishing vessels, fish feeds, cheap processing technology for drying and salting fish, customised cold storage facilities for different fish varieties, at primary and secondary wholesaling and processing level, cold storage equipment and transportation for different modes and invest in domestic fish skin and fish maw trade.

Regarding the cotton value chain, seed cotton production is undertaken by low-skilled family labour, mostly provided by females and youth. Males feature mainly during post-harvest handling, storage, and marketing of seed cotton. One out of every ten middlemen are female. Also, females dominate the stage of ginning cotton into yarn (value addition), and women dominate (60 percent) in performing manual jobs where no skills are required, e.g., transportation, offloading, sucking (packing) and weighing, and cleaning. Investment opportunities and hence jobs lie in investments in industrial by-products: cotton lint and cottonseed; oil; soap; and livestock feed - as well as high-end manufacturing products like cotton yarn, garments, and apparel textiles. Hand-looming was explicitly identified as a low-hanging investment opportunity for women and youths. Policy actions are: First, the government should start providing cotton seed to farmers akin to coffee and tea. Second, stakeholders should support the need to revitalise farmer associations and cooperative unions for cotton. These would solve many underlying challenges farmers face around access to credit and determining the inclusive cotton price rather than leaving it to ginners and the CDO who announce the prices.

ACKNOWLEDGEMENT

The Economic Policy Research Centre acknowledges the financial support for this study under the African Policy Dialogues-Inclusive Development (APD-INCLUDE) project. The team extends special gratitude to the participants of the two Town Hall Barazas held in Jinja on December 14, 2020, for fish and Iganga on March 25, 2021, on cotton. Part of the evidence base for this study are the discussions from the Barazas.

In addition, we thank the key informants from key government agencies of the National Fisheries Resources Research Institute (NaFFIRI) and Cotton Development Organisation (CDO) for their time and knowledge. Last, we thank the reviewers at EPRC Dr. Sarah N. Ssewanyana, Executive Director and Dr. Ibrahim Kasirye, Director of Research, for their detailed and guided input.

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1. INTRODUCTION

It is projected that agriculture and agribusiness in Africa will to grow into a USD1 trillion industry by 2030 (World Bank 2009). In addition, Africa's food markets alone are projected to increase from USD313 billion in 2010 to more than USD1 trillion in 2040. Despite this potential, the sector has registered limited success in generating decent[1] and gainful rewarding employment opportunities for young people. In Uganda, for example, with increasing challenges in the agricultural sector, most youth no longer aspire to work in the agricultural sector (Aga Khan University 2016). Looking for employment in agriculture has become unattractive to the youth, with more options opening from the rather extensive marketing and promotions of employment opportunities in the diaspora (externalisation) by labour employment companies.

Nonetheless, labour externalisation has, sometimes, opened opportunities for the youth, such as inculcating the working culture, skilling, and capacity to mobilise savings as seed capital to start small and medium enterprises (EPRC 2020a). However, most of the youth have not had opportunities for exposure. In this regard, public investments that support youth and women in skills acquisition, and exposure to modern farming systems, for example, the use of greenhouses or promotion of small manageable and profitable animal enterprises (Okwi 2017), will be required.

The Government of Uganda (GoU) is pursuing an Agro-industrialisation (AGI) programme, which presents opportunities for export promotion, import replacement and job creation (National Planning Authority (NPA) 2020). Under this programme, the government intends to leverage industrial linkages and deepen the product space to create more employment opportunities for all, including marginalised groups like women and youth. Fish and cotton are the strategic commodities identified in this programme to drive the desired change.

Therefore, addressing the issues hindering value addition and deliberately boosting it will go a long way in developing the cotton and fish industries and creating more employment opportunities. It is thus vital to establish investible opportunities, the existing skills and information gaps, which, if closed, might enable the youth and women to drive the AGI programme for the country, especially in the fish and cotton value chains. Against this background, the study sought to answer the following questions.

i) Which kind of existing skills and technologies can be enhanced further to ensure robust and sustainable production of fish and cotton?
ii) To what extent can the opportunities identified along the AGI value chains reduce helplessness, vulnerability, or resultant exploitative employment?
iii) In which areas in these value chains should investments be undertaken by both the public and the private sector to foster employment and decent jobs?
iv) To what extent is the existing enabling environment conducive to effectively support the identified opportunities in (iii) above?

The rest of the paper is organised as follows: Section 2 describes the approach used to gather the evidence base for this study and the data sources. Section 3 directly dives into the details of the fish value chain, drawing out the employment and investment opportunities available along these value chains. In addition, we identify the requisite skills requirement by value chain node. In section 4, a discussion is provided on how the current environment in the fish sector will foster such investments. Section 5 then focuses on the cotton value chain highlighting the employment, skills, challenges and investable opportunities for women and youth. We discuss the operating environment within the cotton sector in relation to the future opportunities identified. Section 6 then provides the study conclusions and recommendations.

2. APPROACH

A stakeholder consultative approach was adopted as the main form of obtaining information for the study. The study focuses on the fish and cotton value chains because of the inception and launch of the African Policy Dialogues-

1 Decent work has been defined by the ILO and endorsed by the international community such a Uganda through the National Employment Policy 2011, as "productive work for women and men in conditions of freedom, equity, security and human dignity". It is productive work that delivers a fair/meaningful income, security in the workplace, and social protection for families; better prospects for personal development and social integration; freedom for people to express their concerns, and to organize and participate in the decisions that affect their lives; and equality of opportunity and treatment for all women and men.

Inclusive Development (APD-INCLUDE) Project in October 2019. Stakeholders voted to focus on these two value chains - out of the 14 commodities selected for AGI. The study planned to collect information from *four* (4) sources –desk reviews, secondary data sources, district-level Key Informant Interviews (KIIs), and Town Hall meetings.

The desk reviews included government policy documents in relation to fish and cotton commodities and other relevant development literature. The critical policy documents included the National Development Plan III, The NRM Manifesto 2021-2026, the revised National Fisheries and Aquaculture Policy 2017, the National Textile Policy 2009, and UBoS Statistical Abstracts (several issues), among others. The development literature included relevant publications by (EPRC 2018-agro-industrialisation report and PIMA strategy); the fish value chain studies included publications by the National Fisheries Resources Research Institute (NaFFIRI) and FAO; and the cotton value chain was informed by publications from UNCTAD and Cotton Development Organisation (CDO).

Updates concerning sector performances on production (volumes and values) and exports were obtained from secondary data sources such as time series data from FAO, Uganda Bureau of Statistics (UBoS), United Nations COMTRADE and Trade Map databases.

To complement and fill gaps where data was non-existent, desk reviews and secondary data analysis, national-level KIIs and town hall barazas were conducted. Specifically, KIIs were undertaken with officials from the Cotton Development Organisation (CDO), NAFFIRI and MAAIF. In contrast, Town hall community forums/Barazas were held to provide in-depth insights[2] into the current situation in the fish and cotton value chains, which included - understanding the skills gaps among the youth and women, requisite technologies, challenges and opportunities at different stages of the two value chains. The two Town Hall meetings/ Barazas were conducted on December 14, 2020, for the fish value chain, and on March 25, 2021, for the cotton value chain. Participation was drawn from government ministries, departments, and agencies (MDAs), farmers, and private sector actors (industrialists, processors, traders, and transporters).

3. INSIGHTS INTO THE FISH VALUE CHAIN

This section provides an overview of the fish sector. It discusses various issues on employment opportunities and participation by gender and youth along the fish value chain as captured in literature and stakeholder discussions. Further, the section highlights the nature of investments; and skills required to take part in the fish value chains. As a critical finding, the section shows that women and youth are highly involved in the segments of the value chains where skills requirements are low. However, the need for soft skills and commitment could not be over-emphasised in each value chain amidst other challenges, such as costly initial investment requirements, uncertainty/speculation, and lack of quality control mechanisms, especially in the fish market.

3.1 An overview of fish sub-sector

Uganda's fish sector is critical for GDP growth, foreign exchange revenues and employment generation. Concerning growth, in 2018/19, the fisheries sector's GDP growth of 41.4 percent was the highest contributor to agricultural GDP of 5.4 percent (UBoS 2020). However, in 2019/20, fishing activities registered a slower growth of 1.9 percent 2019/20 compared to that recorded in 2018/19, leading to a slower growth in the overall agriculture sector during 2019/20 (UBoS 2020). This was because of an increase in catches of large commercial species that are naturally accompanied by a reduction in yields of small commercial species and partly to the strict lockdown measures undertaken to curb the effects of Covid-19, in which economic activity reduced tremendously between March to June 2020.

After coffee, the fish sector is the country's second most foreign exchange earner, accounting for an income of about USD200 million per year (UNCDF 2020). For example, fish exports increased from 18,052MT in 2015 to 29,495MT in 2019. This resulted in an increase in value from formal fish exports of about USD 117.6 million in 2015 to USD 174.2 million in 2019 (UBoS 2020). However, the informal fish exports also generated an additional USD 50.6 million in

2 First-hand sharing and updating of important information: whether physically present, remote, or even watching a recording of the session, town hall meetings are important because it can get rid of misunderstandings and foster internal alignment, without the need for back door access to information or second-hand.

2019 from USD 45 million in 2015 (ibid). The earnings per annum are from processed fish produced by 12 factories (NPA 2021). However, these earnings could almost double if the government addresses the destructive fishing methods. With such measures, the catch is estimated to increase to about 700,000MT annually, much higher than the current 470,000MT, with Nile Perch exports alone, contributing about 45,000MT. This would earn Uganda USD301.6 million annually from fish (NRM Manifesto 2021).

In Uganda, the fisheries sector (comprising aquaculture and capture fisheries) employs an estimated 1.7 million people directly and over 3.5 million indirectly along the production and marketing chain (NaFFIRI 2014; MAAIF 2017). About 700,000 people around Lake Victoria benefit from fishery-related activities like local fish-processing, fish trade, boatbuilding, industrial fish-processing, net-making, trade-in fishing equipment, fisheries research, extension services and administration (MAAIF 2018; NaFFIRI 2013). While 20,000 farmers are engaged in aquaculture country-wide (UNCDF 2020), artisanal fisheries[3] constitute the bulk (80 percent) of fisheries activities in the country. This provides livelihoods for the most vulnerable groups within society (FAO 2005). Employment in the fish sector depends on the type of fish. According to NaFFIRI (2014), there are over 10 main commercial fisheries species in Uganda.[4] As part of the informal economy, artisanal fisheries also provide supplementary or employment of last resort (FAO 2004; UNCTAD 2017), given that it requires low capital intensity and allows easy entry by low-skilled people with few other options. It is, therefore, easy to harness the latent, highly informal small enterprises to support job opportunities that advantage resource-poor youth populations within the fishing communities.

Literature on employment in the fishing sector in Uganda reveals that men dominate fishing activities while women dominate processing activities. However, women's dominance is limited to low-scale processing such as frying, smoking and sun-drying, which differs by fish type (COMRED Coastal Consulting 2018; EPRC 2020-Baraza discussions). For example, evidence from Lake Victoria in 2014 shows that out of the 62,875 fishermen, nearly all are men (99.4 percent). This number declined in 2020 but was still high, with 60,242 fishermen (LVFO 2020). Men's dominance in fishing activities is partly explained by the physical strength required during the production/fishing stage. Additionally, the stereotypes against women's engagement in fish catching, such as prohibiting menstruating women from extending near the lake because it affects its productivity (EPRC 2020-Baraza discussions).

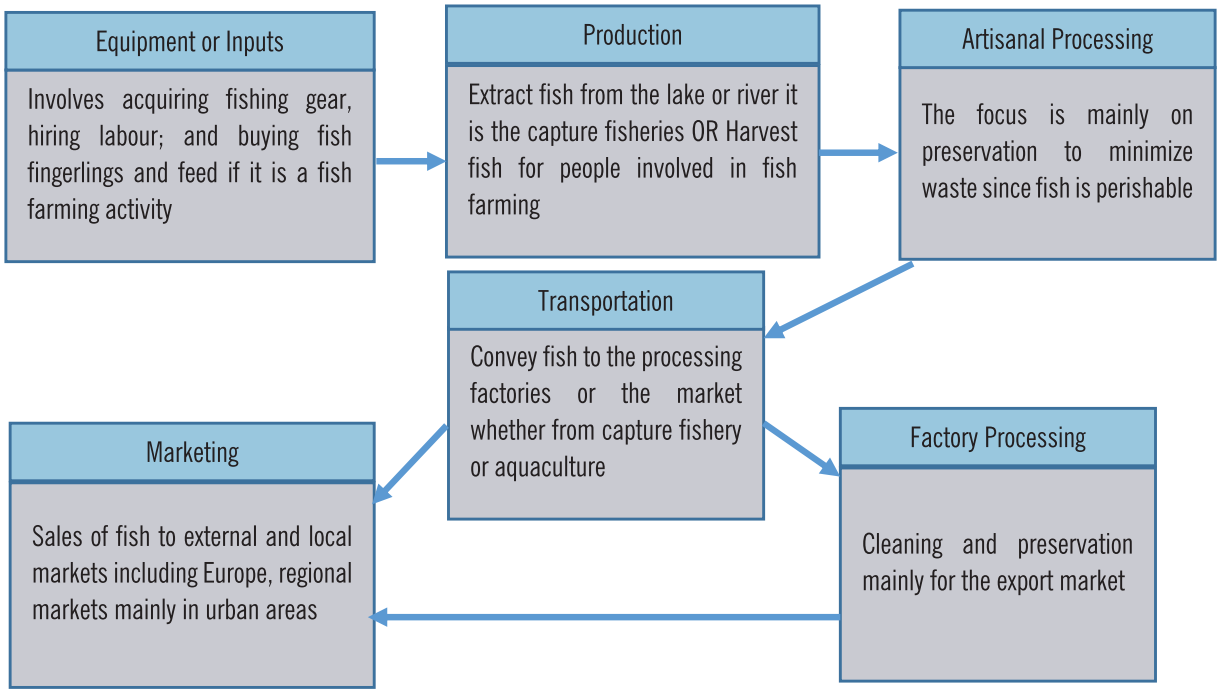
3.2 Employment, skills requirements, and investment opportunities in the fish value chain

Jobs in fisheries, aquaculture, and associated fish value chains range from producing and selling inputs (including fishing gear; boat construction and maintenance; bait; and aquaculture seeds and feed). This then extends to fish catching, farming, harvesting, processing, marketing, and distribution (Figure 1). Production takes place in and around inland water bodies and aquaculture farms. In comparison, fish marketing and distribution can take fish workers far from the original fish harvesting point (FAO/ILO 2013). The marketing and sales people either sell the fish to other marketing professionals or directly to members of the public in a retail setting. Figure 1 shows the fish value chain's general segments with decent job spins-offs for the youth and women. Other job opportunities include guides and outfitters who organize outings for recreational fishermen, let alone highly technical and professional jobs.

3 Consists of various small-scale, low-technology, low-capital, fishing practices undertaken by individual fishing households (as opposed to commercial companies).

4 The main commercial species are Nile tilapia (Oreochromis niloticus), Nile perch (Lates niloticus), Rastrineobola argentea (Mukene), Brycinus nurse (Ragoge), Neobola bredoi (Muziri), Bagrus doc-mak (Semutundu), Clarias gariepinus (Male), Hydrocynus spp (Tiger fish), Protopterus aethiopicus (Lung fish, Mamba), and Alestes spp (Angara). There were a number of fish species such as the native tilapiines of lakes Victoria and Kyoga (O. esculentus and O. variabilis) and the riverine Labeo victorianus (Ningu) which were originally important and highly cherished food fishes but have either disappeared completely or their populations have been reduced to uneconomic levels due to unsustainable fishing practices and environmental degradation (NaFFIRI 2014).

Figure 1 Broad overview of the fish value chain

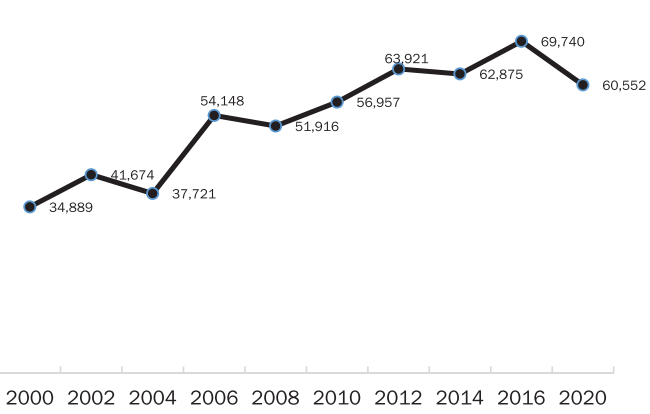

Equipment or Inputs
Involves acquiring fishing gear, hiring labour; and buying fish fingerlings and feed if it is a fish farming activity
Production
Extract fish from the lake or river it is the capture fisheries OR Harvest fish for people involved in fish farming
Artisanal Processing
The focus is mainly on preservation to minimize waste since fish is perishable
Transportation
Convey fish to the processing factories or the market whether from capture fishery or aquaculture
Marketing
Sales of fish to external and local markets including Europe, regional markets mainly in urban areas
Factory Processing
Cleaning and preservation mainly for the export market

Source: Adopted from UNCDF (2020).

Estimating employment in the whole fish value chain across the country beyond Lake Victoria has been complex because of high informality in the sector and the many stages and various actors involved in each stage of the value chain. (FAO 2016). The value chain comprises the equipment stage (pre-harvest), production (harvest), production and processing, transportation, and marketing (post-harvest). The estimates of employment statistics are regularly recorded around Lake Victoria, more so at the production stage-Figure 2 (LVFO, various reports), with gender disaggregation statistics reported only in the most recent three survey rounds of LVFO frame surveys of 2014, 2016 and 2020. Therefore, it is essential to note that the current estimates rarely consider jobs created out of the backward and forward linkage activities of aquaculture or fisheries production. For example, jobs created by fish cage farming that have been expanding recently (Mbowa et al., 2017; Mbowa et al., 2016) managing and maintaining fishponds, etc., are rarely recorded.

Interestingly, the number of jobs for persons engaged in direct production (fish harvest) on Lake Victoria has been growing from 34,889 in 2000 to over 60,000 in 2020 (Figure 2). Such job opportunities have almost doubled. However, there have been notable intermittent decreases in these jobs for some years (Figure 2). The fishing organisations and the army primarily attributed these cyclical changes to controls to allow fish regeneration and curb fishing using the wrong fishing equipment.

Figure 2 Trends in the total number of fishermen on Lake Victoria, 2000-2020



Source: Authors' compilation from LVFO various Frame survey Reports.

Table 1 further shows that direct fishing or harvesting as an activity - is a source of employment for prominent males across all the fish species. Males dominate (97 percent) the participation in direct fishing activities. For almost all fish species/varieties, participants in the Baraza reported the age group to range between 18 - 35 years. It is worth noting that, between 2014 and 2020, over 50 percent of jobs from direct fishing activities were created by capturing Nile perch (Table 1).

In terms of skilling, though some fishing and fisheries professionals require some advanced skills and technical capacities, generally speaking, working in the fisheries sector mainly requires soft and transferable skills, given that most fishing activities throughout the entire value chain are carried out in teams. Therefore, there is a need for strong communication skills, teamwork, and physical fitness. Some of the non-technical or soft skills highlighted in the Barazas included interpersonal, leadership, teamwork, situation awareness and safety on the waters, and physical fitness, among others. The more technical skills mentioned were fishing gear manufacture and repairs, boat manufacture and repairs, fishing-casting of nets, riding boats, business planning, marketing, fish handling and processing techniques, among others. However, the application of these skills differed across the fish species.

From now on, trends in fish volumes traded and employment opportunities are discussed per fish species, i.e., silver fish (Mukene), Nile perch, tilapia etc. The species of focus are silver fish (Mukene), Tilapia (Ngege) and Nile Perch (Mpuuta). This is because, as highlighted by participants in the Baraza. Within the broader fish value chain, each fish species takes on a different value chain with other employment, skills and investments required (Figure 1). In addition, each fish species faces similar but different challenges, given its level of lucrativeness.

3.2.1 Silver fish (Mukene)

According to the most recent LVFO (2015) data, *mukene* production on Lake Victoria rose gently from 58,717 tons in 2010 to 171,210 tons in 2015. The value of production increased from USD 5.0 million in 2010 to 32.1 million in 2015 (LVFO 2015), with exports rising from 545 tons to 12,779 tons over the same period. The major export destinations in 2015 included DRC (15,015 tons), Kenya (4,374 tons) and South Sudan (4,069 tons). Other destinations included Rwanda, Tanzania, and Burundi. In Uganda, it is estimated that only 20 percent of *mukene* is processed for human consumption domestically and exported (FAO 2010), while the remaining 80 percent of production is processed for feeds for livestock, fish, poultry, and other uses. The feeds are produced for both domestic and export markets. Growth in both volumes produced, and export value of *mukene* shows an expansion in business activities in the country.

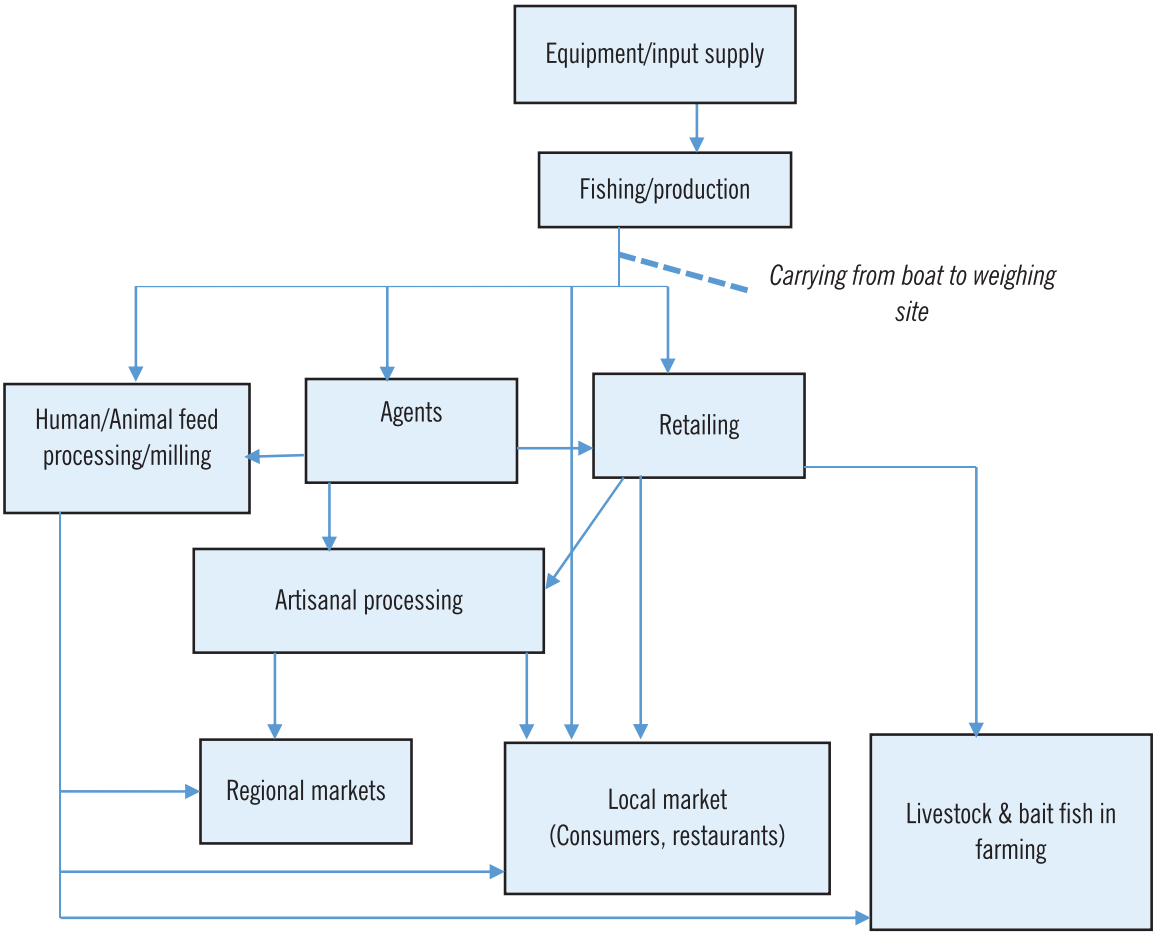
The silver fish (mukene) value chain (Figure 3) has a range of business activities that extend from supplying equipment (as inputs) to production. High (first) grade processed silver fish is milled to produce various products (EPRC 2020). After production, there are retailors/agents/middlemen who

Table 1 Number of fishermen (employment) targeting different species in Lake Victoria by gender

	2014			2016			2020		
Fish type	Male	Female	Total	Male	Female	Total	Male	Female	Total
Nile perch (Mpuuta)	33,116	248	33,364	36,064	218	36,282	34,119	85	34,204
Tilapia (Ngege)	13,665	62	13,727	14,155	79	14,234	15,475	175	15,650
Silver fish (Mukene)	14,506	32	14,538	17,448	45	17,493	10,175	42	10,217
Others	1,224	22	1,246	1,724	7	1,731	473	8	481
Uganda	**62,511**	**364**	**62,875**	**69,391**	**349**	**69,740**	**60,242**	**310**	**60,552**

Source: Authors' compilation from LVFO various Frame survey Reports.

Figure 3 Silver fish (Mukene) value chain



Source: Authors modifications based on the Fish town Hall Baraza, 2020 and literature reviews.

trade in mukene and supply to customers like the artisanal processors (that sometimes salt, dry or deep fry the mukene) and industrial processors such as Maganjo Millers. The latter value chain activity involves marketing mukene both to the regional and local markets (where a sizeable volume of processed silver fish is utilised by poultry farmers).

Employment, skills required and investment opportunities

The LVFO (2016) survey data shows that *mukene* is among the top three employment-generating fish species, expanding over time. For example, the number of persons participating in capturing *mukene* increased by 2,955 fishermen from 14,538 to 17,493 in 2014 and 2016, respectively (Table 1). However, by 2020, this number declined by 7,276, most likely because of restrictions on excessive fishing by the authorities and the emergence of the booming market for fish maw that could have attracted a shift to species like Nile perch. But also, in 2020, general fishing-related activities declined because of the COVID-19 lockdown restriction in economic activities. Table 1 shows significant gender participation disparities, irrespective of survey year, with male fishers (over 99 percent) dominating the *mukene* operations on the Lake.

Using the information collected during the *Baraza* discussion (Table 2), we map out the level of involvement in the *mukene* value chain, highlighting the gender participation, skills required, and challenges. *Baraza* discussion exposed the relatively low skills requirements needed to participate in the silver fish business. In addition, females were reported to be more involved than males in all activities in the value chain other than the production phase, as shown in Table 1. In other words, it is possible to conclude that silver fish (*mukene*) is a woman's and youth business.

Table 2 Employment, gender participation and skills requirements in silver fish (mukene) value chain

Value chain activity	Gender participation	Age group	Skills required	Other (Reasons)
Fishing/production	97% men against 3% women	18 to 35 years This resonates with the LVFO 2016 study, which showed the average age of fishemen was 33.8	None reported by Baraza, but literature indicates skills such as the use of fishing gear and fishing techniques are needed (e.g. use of small gillnets and cast nets, handlines, basket traps, fish scoops, and weirs.) RobertIkoja-OdongoaDennis N.Ochollab 2003.	Highly labour-intensive and physical strength is needed. Hence, mainly male youth are involved. In addition, it is considered a cultural taboo for women to be out on the lake at night. The advantage of having youths in the *mukene* activities was that they were energetic to engage in fishing and move between landing sites and markets to sell *mukene* (LVFO, 2016).
Carrying from boat to weighing	Mainly Male youth	18-35 years	None	Invariably, those who carry from the boat do weighing as well.
Trading (fresh)	is 97% women against 3% men	18 years and above	Grading skills	Skills are gained overtime through practice on the job.
Selling to traders and processors	Men and a few women		Business skills such as marketing and recording keeping	It involves a lot of haggling.
Processing (Value addition)				
Sun drying	Majorly undertaken by women and young girls	18 years and above, but also child labour (girls mainly)	Handling, salting, mixing and sorting	This takes 1 day with good weather. The lack of modern drying technologies during the rainy season compromises the quality leading to enormous losses.
Deep frying	90% of women and male youth		Handling and salting as a preservative.	*Mukene* is deep fried as a snack using only first grade (the best quality), which is very expensive due to low supply. Better technology is required to preserve the *mukene* other than deep frying.
Packaging	Women and youth		Gain packaging skills and engagement in the making of better packaging materials.	
Milling Industrial processing for feeds and industrial processing for food, e.g., baby food	Women	All age adult age groups	Skills in turning *mukene* into powder	
Marketing (local and regional)	Women	Adult women	Marketing skills	Demand and market for *mukene* is high, but the continuous adulteration and mishandling have affected the market. They suggested that a supervisory role for quality assurance is needed. They further urged for demonstrations for local processors located in different places regarding technology and the necessary infrastructure.

Source: EPRC 2021 (Baraza discussions held on December 14 2020).

The findings in (Table 2) to some extent, resonate with the LVFO (2016) region-wide Lake Victoria study on mukene (*dagaa in Swahili)* operators, which indicated that *dagaa* operators' gender distribution was on average, 55 percent males and 45 percent females while the average age was 35.5 years. The majority completed primary education (44.5 percent). The LVFO 2016 study also brings out an essential aspect of skills gaps. As expressed in the Baraaza forums, most *dagga* operators might not have gained the necessary knowledge in business management, quality assurance or value addition.

For instance, the LVFO (2016) study further shows that most (31 percent) of artisanal processors dry *mukene* on bare ground and 25 percent dry it on raised racks. Additional processing technology reported also includes salting before drying, deep frying and drying on nets. Skills to engage in some fishing activities are cross-generational and inevitably and inadvertently driven by low education background within such communities. For example, 40 percent of *mukene* processors reported having incomplete primary education or no education. Only 3.0 percent had obtained tertiary education, and 2.6 percent had a university level of education (LVFO, 2016).

On one hand, the low-key technology (like drying *mukene* on the ground) creates opportunities to employ most of the uneducated youth. Still, such a cohort of uneducated youth would not gain essential knowledge and skills like business management, quality assurance or value addition to substantially upgrade the mukene value chain. This is required to produce high-value by-products like milled infant food supplements and packed *mukene* snacks, with a potential untapped export market in the UAE, Kenya and Rwanda.

Challenges and opportunities

Participants agreed that there are several opportunities for the youth to engage in the *mukene* value chain. These include;

Skilling and training youth to become Jamadali or Madaali exists. To become a Jamadaali, one must have a strong passion for fishing and a strong heart. The Jamadali is always an experienced fisherman above 30 years of age. They sit at the back of the boat to man the process in the waters and are tasked with gathering fellow fishermen (always those below them) to sail on the waters at night. Some participants believed they could teach anyone to become a *Jamadaali,* whereas others disagreed, noting that it is an exceptional natural talent. For example, soft skills are more important than technical skills: soft skills and experience (gained over time) are much more needed in almost all the value chain stages than technical skills.

Exporting dried Mukene to the international market if the required health standards are adhered to. A few fishers' associations are already involved in international trade for Mukene. For instance, Ms. Perus Logose from Kiyindi Women Fish Processors Association said, " They *also export Mukene to countries like UAE, specifically the city of Dubai, Kenya, and Rwanda. She said that the major hindrance is that UNBS has not yet certified their products because they do not have the needed infrastructure."* For *mukene* traders to have access to more international markets, post-harvest measures starting with the handling in the boats and the processing of mukene must adhere to international standards, some of which specify indoor processing of fish. At the same time, *mukene* is currently being processed outdoors and sundried. Therefore, other than marketing, there are investment opportunities for establishing indoor processing and drying systems for Mukene, as well as equipping fishing vessels with appropriate containers to store *mukene* while on the waters. For instance, mechanical drying of *mukene* and the provision of energy sources would speed up drying and deter the poor handling practices of drying *mukene* on the ground, where it is exposed to birds, insects, and rain, all of which tremendously affect the quality of Mukene.

High employer for women: This is evidenced in Tables 1 and 2 on gender participation. Also, evidence elsewhere supports this narrative (Box 1). Almost half of the capture fisheries value chain workforce is female, the majority working in small-scale post-harvest operations in developing countries.

Box 1. Example of gender-based division of labour

Fishing is mostly portrayed as men going out on boats to catch fish while women work as fish sellers and processors on land. This generalisation of the professional roles of men and women is mainly correct, but a closer examination of gender in fisheries reveals a more complex situation depending on the cultural context. In some countries, such as Benin, Cambodia, the Congo, Mali, Nepal and Thailand, women actively fish or collect fish. In other countries, such as Uganda, it is taboo for women to board a fishing vessel, but they can own boats and hire men as crew. As fish buyers, it is not unusual for women to provide the working capital for fishing trips against a guaranteed supply of fish when the catch is landed. In Bangladesh, fishing is traditionally a low-caste Hindu occupation, and only the men in fishing communities are engaged in catching fish. Worse still relatively few women work in fisheries today – an estimated 3 percent of the total female workforce is involved in the fisheries sector – shrimp fry is caught in coastal areas by significant numbers of poor women, irrespective of their religion, age or marital status. In Lake Liangzihu (China), women operate some small-scale fishing vessels.

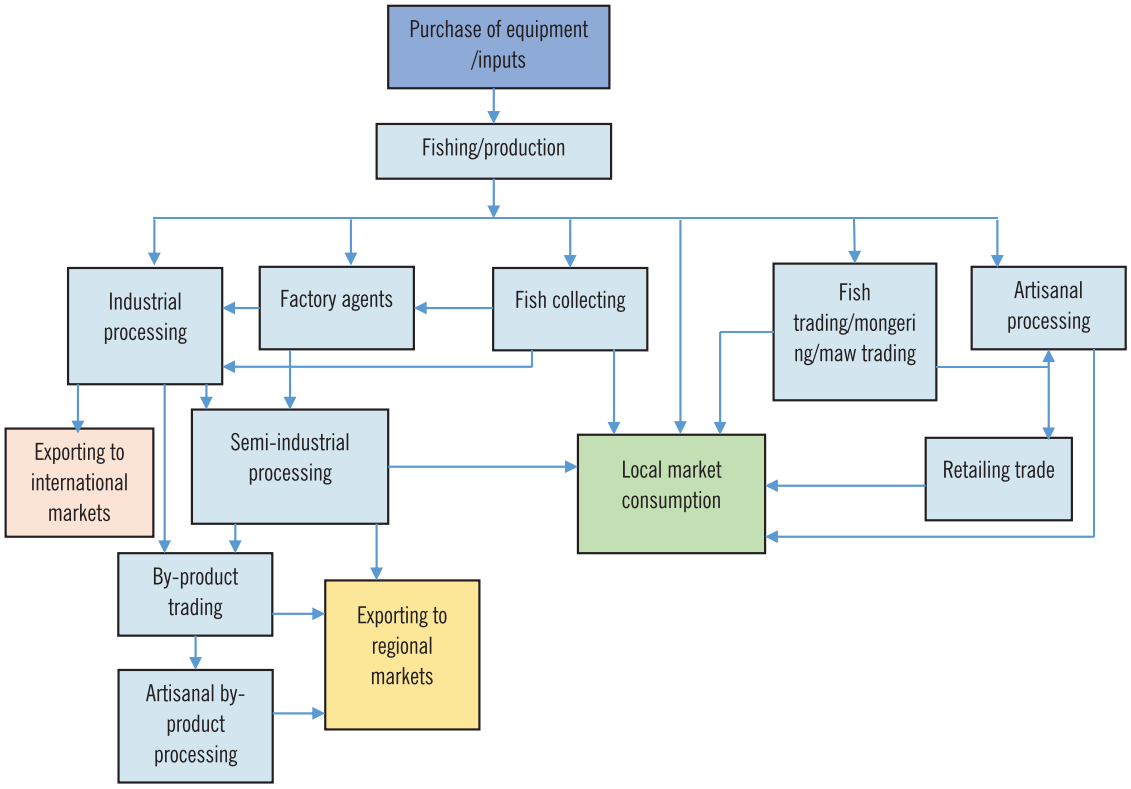
Source: FAO, 2010b.

However, a negative mindset is a major problem hindering their full participation in such work. There are also rampant moral hazards among youth involved in the silver fish (*mukene)* value chain. The most common habit is mixing sand (soil) in *mukene* to gain more kilograms. Participants revealed that this has dramatically affected the quality and created mistrust between sellers and buyers of *mukene*. This was attributed to the lack of regulations and gaps in supervision from quality controllers such as the Uganda National Bureau of Standards (UNBS).

3.2.2 Nile Perch (Mpuuta)

Nile perch (Mpuuta) has Uganda's highest commercial and recreational value. It is mainly found in lakes Victoria and Kyoga. However, the fish population is being affected due to unsustainable fishing practices and environmental degradation (LVFO 2020), which has affected employment gains for fishermen made in 2016. Decreasing stock results in a lower catch, longer working hours, and reduced returns to the fishermen. Nile Perch value chain is lucrative given that it yields one of the most sought-after fish products, the "*maw*".

Figure 4 Nile perch value chain for local, regional and international markets



Source: Authors construct modified from COMRED (2010)

The value chain for the Nile perch fish in Uganda is more complex than that of *mukene* and Tilapia (Figure 4). The wider breadth of the Nile perch value chain renders it more complicated with many more activities and players. These include the production stage, i.e., fishing; the next stage of the chain is determined by the fish size and processing quality (Kimani *et al.* undated). The bulk of high-quality Nile perch fish is sold directly to factory agents or intermediaries with either informal or formal contracts with the processing industries. The products from fish factories (e.g., fish fillets) are exported to international markets. The fish by-products from processing factories are sold to artisanal and semi-industrial processors that produce fish oils and fertilisers in the regional markets.

Other buyers, such as fish collectors, artisanal processors, fish traders/mongers/ maw traders, targeted fish of un-processable quality (relatively smaller size). These interact mainly with the retailers and target the local market (households, restaurants, hotels). Fish collectors usually have no investments in equipment nor add any value to the fish, but only act as middlemen.

Employment, skills required and investment opportunities

Nile perch is the leading employer of fishermen (over 50 percent) (that includes boat owners and fishing crews) on Lake Victoria (Table 1). For instance, the 2020 LVFO data on harvest shows that 53.1 percent, 52.0 percent, and 56.5 percent in 2014, 2016 and 2020, respectively (see Table 1), were employed as Nile perch fishers (boat owners and fishing crews) on Lake Victoria. This study could not ascertain the additional jobs in the chain that involve many individuals in the pre-harvest, harvest, and post-harvest activities. However, the number of those involved in the post-harvest sector is estimated to be higher than those of fishermen if indirect and auxiliary services are included.

According to COMRED (2018), there are about 363 approved landing sites in Uganda on Lake Victoria alone. Only 30 approved landing sites are gazetted to handle fish destined to fish processing establishments. Nile Perch being the major commercial species, it was approximated that 90 percent of the 363 approved landing sites handle the species on the Lake. It was also estimated that there is an average of about 51 fish traders, 8 factory agents and 16 small-scale fish processors per typical landing site. This translates to an average of 75 direct post-harvest actors in the Nile perch fish value chain.

Nonetheless, Table 3 provides the highlights using feedback from Baraza stakeholder discussions regarding employment by gender, skills requirements, and gaps by value chain activities in Nile Perch trade, local, regional, and international.

Table 3 Nile Perch value chain participation and skills requirements

Value chain activity	Gender participation	Age group	Skills required	Other (activities)
Fishing and storage while on the water	Male youth (70%) and experienced older men (30%).		Physical strength/hard labour, boat riding, net setting, hooking, ability to identify the fish nest (*Kibikiiro*), net retrieving.	Proper net retrieving saves time and avoids fish spoilage. Most skills do not need to go to school and are gained over time through practice.
Weighing and icing	Male youth and men	18 years and above	No special skills required	Sharing fish catch and proceeds; grading by the fish inspectors to ensure quality. The stage also involves grading by the fish inspectors to ensure quality.
Offloading (from the boat), sorting, weighing and transportation	Male youth	18-35 years	Level grading according to size and weight (in Kgs)	Fish weighing 1kg to 4Kgs is always sorted into one category, and that which weighs 5kg and above is also categorized differently.

Value chain activity	Gender participation	Age group	Skills required	Other (activities)
Selling to traders and processors	Women			Fish not taken to the factory is sold to women processors/groups. Dealing in the Fish maw (*nnuuni*/ swim bladder) is also sold here
Processing (Value addition) at the factory			Grading and quality assurance	Fish inspectors to ensure quality assurance
Off-loading from the vans	Male youth		No particular skill is required other than physical labour for engaging in washing, sorting and grading	
Processing section	Mainly male youth (70% males and 30% females)		Filleters, skinners and packaging	Females commonly do trimming, shaping and packing
Packaging, Loading and offloading and transportation	men, especially male youth	youth	Nothing special as these can be acquired on the job.	Processed fish is then loaded into trucks for export by men.

Source: EPRC 2021 Proceedings report for the Fish Baraza discussions held on December 14, 2020.

Key takeaways from the table are that trade in Nile perch, unlike *mukene,* is male-dominated with a high level of youth involvement, especially the male youth. Again, soft skills seem to be the most desired component in each value chain node, with a certain level of physical strength required. Women are mostly found at the processing stage, mainly selling the by-products of Nile Perch, like the 'fish frame' after the fillet has been removed. Of note is the low involvement of women, attributed mainly to the high initial investment cost, which they do not have, and the high risk of traversing the lakes for extended periods, especially at night. Most of the fish fillet and "maw" is for export. Fish maw drives the price of Nile Perch fish since a kilogram of the maw fetches a far higher price than a kilogram of the fish itself. A kilogram of the fish maw in 2020 was estimated to fetch between Ugx 900,000 to over Ugx1 million. Fish maw has various uses, including the manufacture of surgical sutures. Still, it is also a delicacy in China, where it is served in soups or stews in addition to being used as a source of collagen. It is also used to make water-resistant glue and in the production of isinglass, a refining agent used to manufacture beer and wine. Here, the potentially lucrative and decent jobs in the hotel, pharmaceutical and beverages industries are inevitably exported to China.

The findings in this paper are like those undertaken elsewhere, such as by COMRED (2018). They also emphasise that even within semi-industrial processing, women are primarily involved in salting and cleaning the fish frames while men do the packaging and loading. This differs from the industrial fish processing establishment, where men and women are involved in all sections within the processing department, except for the loading and packing dominated by men (Table 3).

Challenges and opportunities

This study has revealed that the Nile perch value chain is complex. Nile perch flows through several stages, from the landing sites to the consumers. Several actors are involved at different stages of the value chain. Women remain significant players in the processing and trade of Nile perch. Therefore, most of the challenges in the Nile perch business arise from the speculative and restricted nature of the fish maw business. These include;

Abandoned education: It was noted that the fish maw price had affected the social dimensions like education, where children have abandoned school to engage in its trade. If the quantity of fish maw reduces, the children become idle and threaten the security situation as some youth end up abusing drugs.

*Uncertainty in market prices and regulation. G*iven that the cost of Nile Perch is determined by the grade or size of the fish maw, this has created uncertainty in the overall pricing of the Nile perch. They emphasised that since the trade in fish maw is new to most Ugandans, there is still no law governing the business. Therefore, the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) needs to regulate the price, so that buyers do not cheat fishermen.

The Nile Perch (*Mpuuta*) and fish maw (*nnuuni*) are still restricted to a few traders who are mainly Chinese engaged in export to China. They deal with middlemen and do not buy directly from the fishermen; hence, the value chain is not well formalised and optimised for the fishing communities to fully benefit from additional income. Moreover, the full range of products that can be extracted from the fish maw has not been fully explored or understood locally.

Limited available capital. Inadequate capital portfolio among the youth and women. This is because engaging in the fish by-products business requires about Ugx10 million to acquire a tender with the fish factory that supplies the different by-products. Participants suggested that a factory for fish maw be established.

Some opportunities for creating decent jobs lie in:
Investing in technologies that can transform Nile perch by-products, especially the fish skin and fish maw, into premium products that attract high-end consumers. For instance, women are already well engaged in the trade of fish by-products such as fish skin, fats, carcasses, and white meat from the carcass. There is an opportunity to invest in the fish skin to produce high-quality leather and generate oil production from the fats, which are rich in Omega 3 fatty acids. Other products, such as baby food and animal feeds, can be produced from the white meat on the carcasses. Other studies have also highlighted investment potential in Nile perch wastes, e.g., the production of high-quality leather (Muyonga et al., 2004; Muralidharan et al., 2013); extraction and refinement of oil from the Nile perch viscera (Okoth et al., 2015), belly flaps (Ogwok et al., 2009), and heads (Turon et al., 2005).

In addition, smoking also provides job opportunities for the youth and women. Nile perch smoking currently offers employment opportunities for both youth and women, but the processing is still very rudimentary. Investment in cheap processing technologies will improve the quality and price fetched by the youth and women and create additional job opportunities.

Improvement of fish packaging materials for domestic and regional markets. Nile perch has several products traded in the national and regional markets, and costs for these products are not significantly different in the regional market despite the origin of the fish product. There is a need to move away from using polythene '*kavera*', baskets, and sacks packaging materials. There is a need to explore using materials that are not fragile and can be easily cleaned after use, to prevent recontamination of the fish products.

3. 2.3 Tilapia (Ngege)

The tilapia value chain is slightly like that of the Nile Perch but different due to the advent of aquaculture. Unlike Nile Perch and *mukene*, tilapia has been domesticated and commercially bred in cages and fish farming ponds. In addition, it has not been featured in the fish maw extraction business (Figure 5). Employment in the tilapia value chain starts from enterprises that supply equipment/inputs for; fishing directly on lakes and fish farming - either in cages on the lake or in fishponds on land. The value chain for the captured tilapia on lakes creates jobs from several activities such as direct fish selling for industrial processing, wholesaling, retailing and jobs for agents who transport fish from the landing sites to the processing facilities as well as to the village and the city markets. Fish sold for industrial processing is of a specific grade and quality, destined for the international or regional market. Some of it is smoked for the local and regional markets, i.e., D.R. Congo, Kenya, and South Sudan. Tilapia is also sundried and exported to Bambari and South Sudan.

Unlike the captured tilapia fishing chain, the aquaculture chain has fewer activities and actors (Figure 5). Specifically, the aquaculture chain links fishers/producers directly to consumers or retailers. Middlemen have minimal or no role in the marketing channel. Tilapia produced on fish farms is sold directly to consumers or retailers nearby. Sometimes, farmers sell directly to individual consumers, fish retailers or nearby small establishments such as restaurants, schools, and hotels. Fish is mainly sold fresh. Some low-cost preservation technologies, such as smoking and deep-frying, are used by some farmers/small-scale processing to add

value and increase the shelf life of fish. Unsold fish are kept in the ponds because of the lack of cold storage facilities. Bicycles, motorcycles, or public transportation make fish deliveries easier and cheaper. Sizeable volumes of small tilapia fingerlings produced on aquaculture farms are sold as baits to aid in capturing Nile perch. It has been documented drawing experiences from Kenya that the marketing of tilapia is different from that of Nile Perch (Quagrainie *et al*. 2011). The marketing of tilapia becomes distinctive because of the rigorous auctions involving the participation of customers congregating at the landing sites. The highest bidder takes the fish, and there is no weighing (Quagrainie *et al.* 2011).

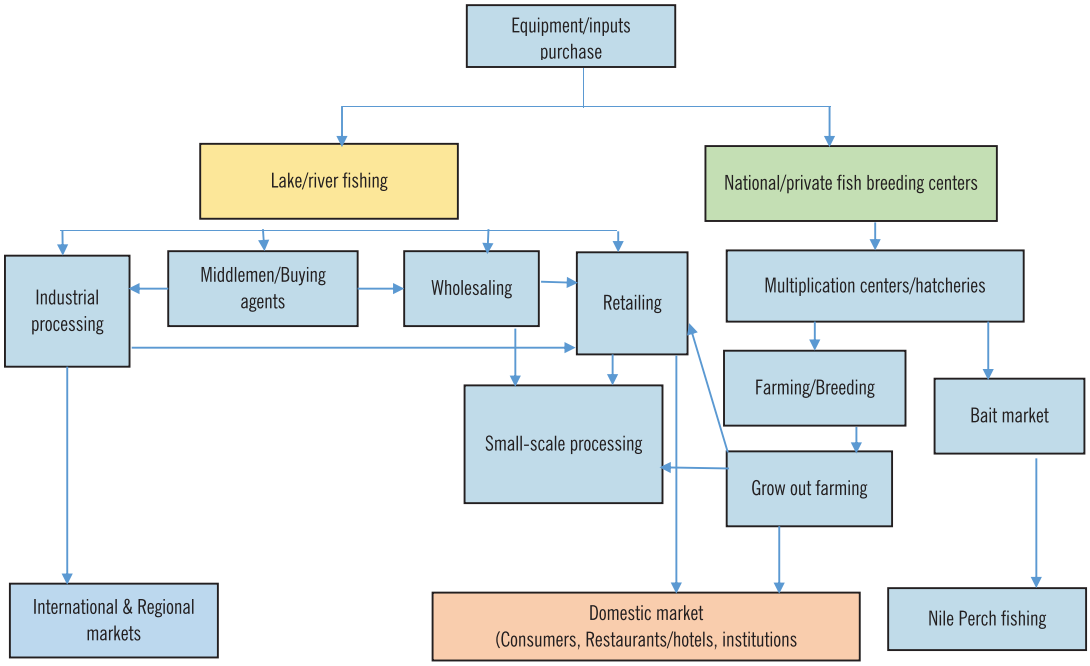
Opportunities for decent employment, skills, and investments requirement

Tilapia ranks as the third most crucial generator of fishing employment for fishers in Lake Victoria (Table 1). It is important to note that, unlike the Nile Perch and *mukene* species, the share in the number of fishermen engaged in tilapia production has steadily increased by 14 percent between 2014 and 2020 (Table 1). This positive trend in tilapia fishing activities can be attributed to the uptake of cutting-edge technologies in fish farming (aquaculture), both in cage farming and fishponds (Mbowa *et al*. 2017; Mbowa *et al*. 2016). Interestingly, over time, females are increasingly getting involved in the production stage of the tilapia value chain (see Table 1). This employment growth is likely because aquaculture is proven to be more productive and labour-intensive. A farmer using floating cage technology produces 48MT (12 times) of fish per annum, compared to only 4MT produced by the counterparts practising capture fishery (ibid).

Additionally, aquaculture involves construction and maintenance, feeding fish, collecting manure, fertilisation, and protecting ponds. In addition, labour is also required to harvest, process, and market fish (Nyombi and Bolwig 2004; Jagger and Pender 2001). Both men and women can undertake these activities.

Tilapia is the most common species bred in cages, and cage farming is one technology that can provide decent employment for the youth. Participants in the baraza mentioned that cage farming is a male domain in which men own 98 percent of the cages. Harvesting fish from the cages happens only when the market has been identified and all price negotiations have been done. Buyers are always exporters to the regional market. A kilo of cage fish goes from Ugx 7,000 to Ugx 10,000. Participants agreed that support from fisheries supervisors is critical and needed to boost the production of cage fish farming and investment in a one-stop centre for feeds, fingerlings, and cages.

Figure 5 **Tilapia value chain**



Source: Authors construct with modification from Quagrainie et al. (2011) and Baraza discussions

The youth offer labour, which involves feeding the fish, grading, sampling, and harvesting when the fish matures. In addition, youth are more engaged in cage farming, although they are always working for the cage owners (bosses) because of the lack of initial capital required to start a cage. Those working as employees are always paid a monthly salary ranging between Ugx 200,000 to Ugx 500,000 per month for managing a cage with about 5,000 fish. One person can manage 10 cages of 5,000 fish capacity per cage. Women and men are all involved in the selling and buying of Tilapia.

Underlying challenges and opportunities

Most participants agreed on the need to mentor and attract youth in aquaculture for Tilapia production. They proposed that this may be done through fishers and producers cooperatives focusing specifically on challenges for the youth and women, such as inadequate capital, lack of mentorship and training in the best practices, and lack of bookkeeping skills.

Social norms and costly inputs: Using boats to regularly patrol and feed fish in cages hampers most girls and women from engaging in the cage fish farming business. The inputs are also very costly, i.e., about Ugx 3 million for nets and other initial requirements minus the fish stock. The required fingerlings must weigh about 75 grams, yet fingerlings are scarce. This means there is potential to invest in fingerlings, but a special hatchery is costly for the local fishermen.

Limited skills and patience: It requires high technical skills to manage a fingerling hatchery and cage farming. Skills needed range from the ability to interpret manuals, timing of feeding, temperature detection and weather monitoring. Therefore, youth need to be skilled in how to grow fish in a cage. Furthermore, earning from cage fish farming requires a lot of patience because it takes about 6-10 months for the fish to mature, and yet most youths are very impatient because they want quick money and thus end up not venturing into cage fish farming.

Opportunities for investment

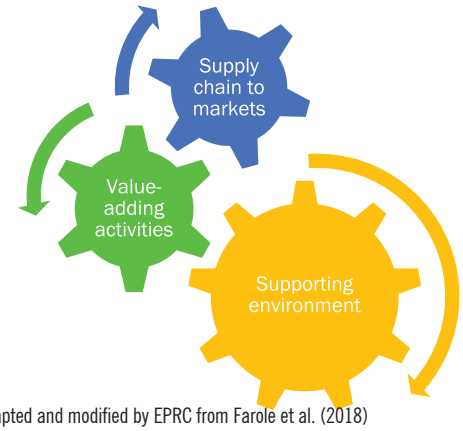
Aquaculture, especially Cage farming, offers investment opportunities along its value chain. One area is *feed production*. About feeding for the fish cages, it was agreed that there is a need for import substitution for feeds because they still import most feeds from abroad. Local capacity needs to be built in the making of fish feeds. There is an investment opportunity in feed manufacturing, given that feeds take 70 percent of the input in cage fish farming. The difference between cage fish farming and fishponds is that fishponds require one to own land – a major constraining factor for the youth and women. Fish cages are in the lake.

Investments in making cages- The Baraza participants explained that most of the materials for constructing cages are imported, and it is very expensive for youth and women to own cages. Thus, there is an opportunity for returnees and other local and/or foreign investors to produce cage culture materials locally and cheaply. Additional investment opportunities identified by other studies include fish seed production, cold storage, value addition, consultancy, and marketing (Njiru et al., 2019; Nyamweya et al., 2022).

3.3 What does the operating fishing environment look like?

In a value chain setting, the interplay between value-adding activities and the supply chain requires an enabling environment to ensure the sustainability of all underlying activities and jobs (Figure 6).

Figure 6 **Interplay between value-adding activities and supply chains with the operating environment**



Source: Adapted and modified by EPRC from Farole et al. (2018)

Notes:
1/3 *Value-adding activities* include: Research & Research Development, Design, Production, Logistics, Marketing and services
2/3 *Supply chain to markets* (domestic & international) include: Raw materials (Natural & synthetic fibres), textiles (Yarn & Fabric production), final products (apparel production) and distribution and sales
3/3 *Supporting environment* includes Infrastructure & finance, government services

(laws and policies), business, information & technology services, education, testing & training, trade & professional associations and NGOs & standards. The international and regional environment also affects domestic operations.

Fish in the global[5] and regional[6] policy discourse is well articulated. This is partly because of the SDG goal of protecting life under the seas and water bodies. At the national level, regarding the regulations, the Fish Act (1964), which is currently under review, is the principal Act from which regulations for fish are developed, and Fish (Aquaculture) Rules 2003, which regulate aquaculture practices, especially at the commercial level among others[7]. Consequently, the Fish sector has one primary policy, the revised National Fisheries and Aquaculture Policy, 2017. Many other regulatory frameworks exist[8].

As noted earlier, enforcement of most laws and regulations surrounding the fish value chain has mainly focused on the production phase. The National Agriculture Research System Act has opened fish research to other public or private institutions and individuals. On-farm trials and 'farmer participatory research' have been the norm. Another intervention at production has focused on fostering Research and development through the Kajjansi Aquaculture Research and Development Center and NaFFIRI. NaFIRRI carries out regular stock assessments of the lake using acoustic surveys, which also show a drastic reduction in the biomass of Nile perch (NaFIRRI *undated*).

Nonetheless, fisheries resource management has been given little attention, regardless of the existing policy. The licensing of fishing boats was the responsibility of local governments, and the revenues collected in this manner belonged to local governments. However, it turned out that local governments saw this as a welcome revenue source.

The enforcement of standards through the Uganda National Bureau of Standards has been considered inadequate at the processing level. Especially the limited enforcement of monitoring standards at the processing level needs to be revamped. MAAIF and FAO reviewed the Fish Act of 2000 Cap 197 and have proposed the Fisheries and Aquaculture Bill, 2018, to accommodate aquaculture activities such as management of commercial fishing, fish selling, post-harvest handling, fish transportation, surveillance, and control monitoring of fisheries units and fisheries research. The Bill is yet to be ascended into law after the review from the President.

While fisheries contribute 12 percent of the agricultural GDP of Uganda and supply 50 percent of animal proteins consumed in the country, several challenges still seriously affect the economic and social contribution of fisheries and aquaculture. Challenges include overfishing caused by increasing demand because of population growth, use of illegal fishing gear, poor quality of fish seeds, limited access to fish seeds and feeds, and continued trade in illegal and unrecorded immature fish costing the country about USD 429 million in income lost. The limited enforcement of the Fish and Aquaculture Policy, 2017, especially in the upper nodes of the fish value chain (transportation, processing, and marketing stages), is a major bottleneck to developing favourable fisheries and aquaculture sub-sector in Uganda.

If not regulated, aquaculture can become a potential environmental risk, such as increased water pollution and loss of biodiversity. Unplanned aquaculture can also lead to competition among other resource users that can degenerate into conflicts. The proposed Fisheries and Aquaculture Bill 2018 will help address some of these challenges and foster a sustainable sub-sector. The revised proposed law will also help address post-harvest losses resulting from inadequate fish handling facilities and poor hygiene while increasing the availability of fish and fisheries products for marketing and consumption.

5 The 41st Session (2014) of the Committee on World Food Security (CFS); The 27th Session (2007) of the FAO Committee on Fisheries (COFI); and The 28th Session (2009) of COFI

6 The FAO Code of Conduct for Responsible Fisheries, the Convention on Biological Diversity (CBD), the Treaty for the Establishment of the East African Community (Article 114 provides for the management of natural resources. The Partner States agreed to co-operate through the adoption of common policies and regulations for the conservation, management and development of fisheries resources), the 1994 Convention for the Establishment of the Lake Victoria Fisheries Organisation (LVFO), Protocol for the establishment of the Lake Victoria Basin Commission (LVBC), The 1971 Ramsar Convention on wetlands, the Convention on International Trade in Endangered Species (CITES) and the 1992 Technical Corporation for the Promotion of the Development and Environmental Protection of the Nile Basin (Tecconile).

7 The National Agriculture Research System Act (2005) regulates fisheries and aquaculture research among other agriculture research areas. The Land Act (1995) spells out the tenure system for land ownership and legal rights of what can be done in and on one's land. The Act also defines ownership of wetlands, swamps and other shallow waters within one's confine or land.

8 Other sectoral and inter-sectoral policies relevant to the National Fisheries and Aquaculture Policy include: The National Environmental Management Policy (1994), The Wildlife Policy (1995) recognizes fishes as a form of wildlife, The National Wetlands Policy of 1995, The Water Policy (1995) takes into account economic, liberalisation, privatisation and decentralisation reforms and recognizes good quality water for the growth of the water biota including fish, The National Development Plan (NDP), the National Agricultural Research (NARs) Act, 2005 and the Agricultural Sector Strategic Investment Plan (ASSIP). The operating environment allows establishment of co-management of fisheries resources through formation of community Beach Management Units (BMUs) for fisheries planning and management. The EU's Fisheries Management Program funded the Lake Victoria Fisheries Organisation (LVFO), which has substantially boosted fisheries management in Lake Victoria. The LVFO works to strengthen the policy frameworks of Kenya, Tanzania and Uganda, and it has had an impact on the Ugandanfisheries policies. Specifically, the Ugandan statute on BMUs (2003) and the National Fish Policy followed the regional East African initiative.

4. INSIGHTS INTO THE COTTON VALUE CHAIN

This section provides insights into the employment potential of the cotton sector along its value chain. It points out aspects of the skills requirements, where gaps exist, and the types of investments that interested persons can engage in to benefit from the cotton sector.

4.1 An overview of the cotton sub-sector

Cotton is one of Uganda's leading export earners and key for livelihood as an employment avenue. Based on data from UBoS (2020), estimates indicate that formal exports of cotton's contribution to GDP doubled between 2015/16 and 2019/20 (from 0.023 percent to 0.046 percent, respectively). This was attributed to fluctuations in production and low international cotton prices that led to the hoarding of cotton lint by middlemen.

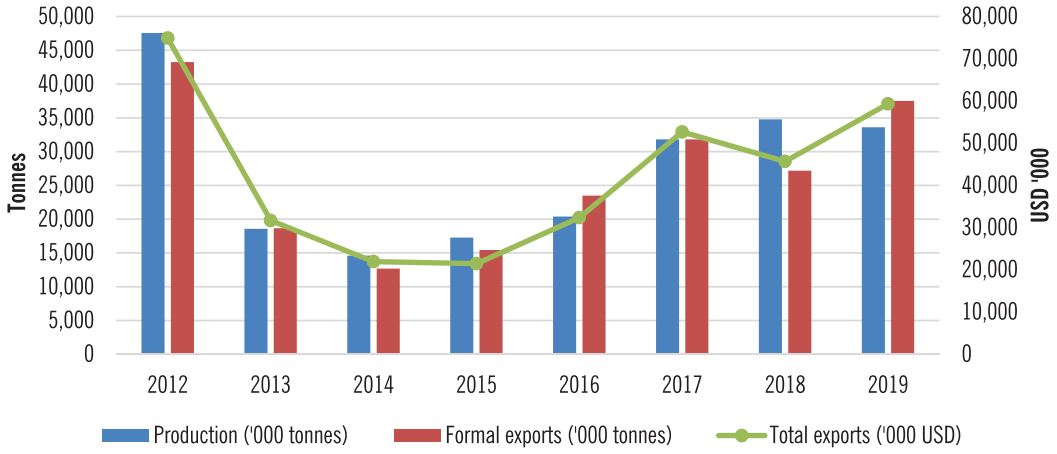
In terms of production, from Figure 7, there was a 29.4 percent reduction in the volumes of cotton produced, and production declined to 33,600 tonnes in 2019 from 47,577 tonnes produced in 2012. In 2019, production had picked up to 33,600 tonnes but was still below the 2012 production performance. This is because cotton growing activities also declined by 4.9 percent in 2019 (UBoS 2020). There are incidences in which formal cotton exports in tonnes exceeded production. This anomaly arises in incidences where not all cotton produced yearly is exported, increasing the amount of cotton exported in subsequent years. For example, in 2019, 33,600 tonnes of cotton were produced, and 37,520 tons were formally exported (Figure 7).

Cotton export earnings (formal, informal and re-exports) declined after 2012, as demonstrated in Figure 7. Nonetheless, there was some improved export performance in 2019 (USD 59.3 million), of which USD 37.5 million were earnings from formal exports. The fluctuations in production are attributed to fewer farmers participating in the cotton production process due to falling prices. Given that Uganda's cotton is 90 percent exported, the price is very much a function of the global international prices set at the Liverpool Index (DM 2016). This exposes cotton farmers to fluctuations in the world market lint cotton prices and discourages production and value addition, especially when prices are so low.

4.2 Employment, skills requirements, and investment opportunities in the cotton value chain

Cotton is the most widely used natural fibre in textiles, accounting for one-third of total fibres manufactured worldwide. Beyond textiles, the cotton plant yields lint and seeds that are turned into fibre, edible oil, and animal feed. Globally, cotton represents the primary source of livelihood and revenue for up to 1 billion people, out of which 250 million work in cotton processing and 100 million are farmers who cultivate cotton (Voora et al. 2020). In Uganda,

Figure 7 Cotton production (tonnes) and export (USD) performance: 2012-2019



Note: Cotton Development Organisation (CDO)
Source: UBoS, Statistical Abstract, 2020.

the cotton value chain employs about 2.5 million, directly and indirectly (Lugojja 2017). In this subsection, we discuss more on these issues.

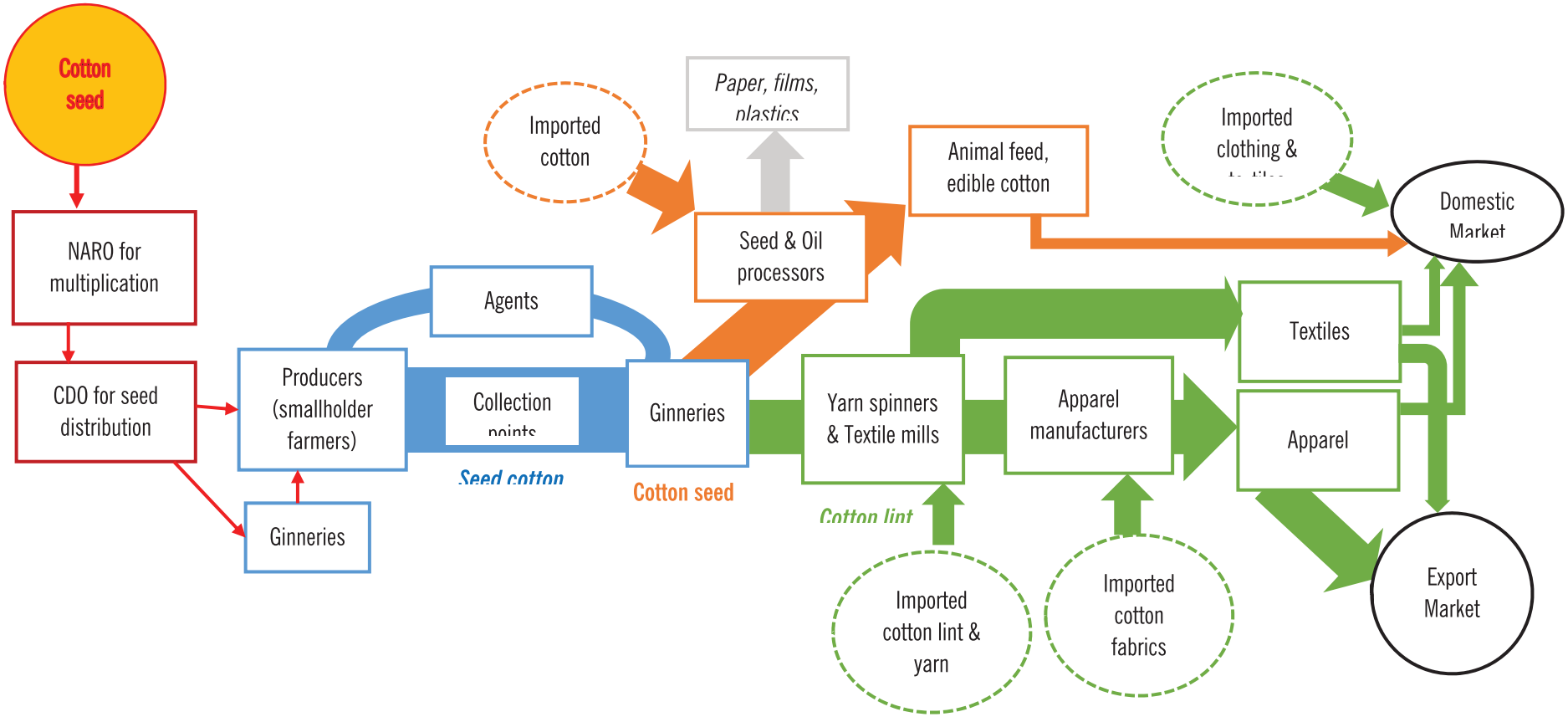
4.2.1 The cotton value chain

The cotton value chain in Uganda (Figure 8) starts on the farm, with the production of seed cotton by about 200,000 - 250,000 households spread over 2/3 of the country (Lugojja 2017). In Uganda, it is the lint value chain that is more developed (UNCTAD 2018). Other employment-generating activities beyond on-farm cotton production include ginning, spinning into cotton yarn, weaving/knitting into textiles, absorbent cotton wool production and edible oil extraction.[9]

Uganda's cotton and textile value chain produces many industrial by-products: cotton lint and cottonseed; oil; soap; and livestock feed - as well as high-end manufacturing products like cotton yarn, garments, and apparel textiles. These lines of products present a massive potential for growth and employment opportunities for women and youth. For example, Southern Range Nyanza Ltd and Fine Spinners (U) Ltd have a combined installed capacity of approximately 2,450 spindles, produce 920,000 pieces of garments and employ over 3,470 people, of which 43 percent are women (ibid.). The above processes present employment opportunities for many Ugandans as farmers and farm labourers, seed cotton and cottonseed buyers, transporters, ginnery workers, cotton exporters, textile and garment manufacturers, oil millers, etc.

9 UNCTAD (2018). Cotton and its By-Products in Uganda: Analysis of Cotton By-Products Survey. United Nations Conference on Trade and Development (UNCTAD), Commodities Branch, Palais des Nations 8 14, Avenue de la Paix 1211 Geneva 10 Switzerland Phone: +41 22 917 1648 / 6286 E-mail: commodities@unctad.org. UNCTAD/DITC/COM/INF/2018/2

Figure 8 Uganda's cotton value chain



Notes: 1/4 ***Blue*** is the chain of seed cotton- Collection points include traders and stores, farmer groups/cooperatives
2/4 ***Orange*** is the chain for cotton seed which is turned into husks, seed cake and edible oil
3/4 ***Grey*** is the chain for cotton linters from which paper, film and plastics are produced.
4/4 ***Green*** is the chain for cotton lint, where we get Yarn and cotton wool. From yarn, we get fabric through the process of weaving /knitting from which textile/garments/apparel is got

Source: Adapted and modified by EPRC from Climate Focus on Kenya's Cotton Value Chain (*undated)* and Lugojja (2017)

4.2.2 Employment, skills, and technology requirements along the cotton value chain

In 2011, about 3,501 small and medium business enterprises (SMEs) manufacturing textiles and wearing apparel products alone employed 20,865 people (EPRC 2017). However, up-to-date insights into how many people are employed along the entire value chain, skills, and gender participation are limited. This data gap is dealt with by reporting comprehensive narratives recorded from the Baraza discussions (summarised in Table 4). Cotton production is undertaken by family—using low skilled labour provided mainly by women and youth who perform these highly manual jobs like; land preparation, planting, weeding, and pruning to harvesting, earning a meagre remuneration ranging between UGX 50,000 to 80,000 per acre. Men feature mainly during post-harvest handling, storage, and marketing of seed cotton. However, some of the Baraza discussions reveal that despite good stories of change for farmers involved in growing cotton, the political economy within the cotton-growing regions is not supportive of the activity.

The Baraza participants did not raise any skilling requirements for farming and production of cotton. However, discussions with practitioners revealed that there are skills gaps in cotton agronomic practices, land management and soil fertility, but most especially lack of knowledge and skills in handling herbicides and pesticides. Pesticides are often used, stored, and disposed of improperly, creating a dangerous situation for both people and the environment. The participants, however, highlighted skills gaps in post-harvest handling and grading, including good management practices—for harvesting and storing seed cotton. This resonates with studies conducted elsewhere (Ahmad et al. 2019) who found a knowledge gap in the production practices of cotton with the highest gap in "biological control of insect pests" and "physical control of insect pests", and Ali (2008) found most farmers were having low knowledge level regarding the selection of quality seed and variety, maintaining proper plant population, and clean picking of cotton. The lowest knowledge gap was found in "land preparation" and "de-linting".

To be employed as a middleman in bulking and storing seed cotton, one requires business skills like; seed cotton quality assessment and taking accurate readings while weighing the cotton seed (Table 4). The respondents also reported that only one out of every ten middlemen are women, and most men sell the lint to the middlemen/women or stores or ginners. At the stage of ginning into cotton yarn (value addition), women dominate (60 percent) in performing manual jobs where no technical skills are required, e.g., transportation, offloading, sucking (packing) and weighing, and cleaning. Obviously, the higher the technical skills required in jobs (like mechanical, electrical, and computerized tasks), the less likely women will be involved. Nonetheless, more youth are employed (both males and females) in the ginneries (Table 4).

Table 4 Employment and skills requirements by Cotton value chain activity

Value Chain	Activities	Participation	Skills required	Other Comments
Farming/ production	Land preparation	- Youth (Over 80 percent of the land preparation is done by youth) - Women (3 to 5 women out of 10 involved in land preparation) - Children	No special skills other than physical fitness and strength	- Highly labour intensive, requiring significant physical strength. Family labour (Husband, wife and children) is always used. They negotiate payments according to the area to be covered in cases where labour is hired. - If family labour is not used, the land is cleared at Ugx 50,000 to Ugx 70,000 per acre. However, a tractor hire costs between Ugx 80,000 and Ugx 100,000. Ox plough costs Ugx 60,000 per acre. - The type of land used is either privately owned or hired.
	Planting	- Youth - Women - Children	No special skills except fertiliser application skills in cases where fertilisers are used	Planting differs according to whether it involves fertiliser application or not. Ugx 30,000 to Ugx 60 000 is charged when planting does not involve fertiliser use. However, when fertiliser is applied, it ranges between Ugx 60,000 and Ugx 80,000 per acre.
	Pruning	- Youth - Women	No special skills	Women predominantly do pruning with minimal participation of men. Family labour is extensively used, but in cases of hired pruners, they charge between Ugx 20,000 to Ugx 40,000.

Value Chain	Activities	Participation	Skills required	Other Comments
	Weeding (*Okuduba*)	- Women (8 out of 10) - Youth (2 out of 10)	No special skills, unless herbicides are used, herbicide application knowledge and spraying skills are required	- Youth and women mainly do weeding. There are always different stages of weeding, and the weeding of Cotton is done at least twice before maturity. In the case of hired labour, weeding costs between Ugx 30,000 to Ugx 60,000 per acre. The cost depends on the height of the weeds on the farm. Herbicides for weeding cost about Ugx 20,000.
	Spraying	- Men	Basic spraying skills	- Spraying happens almost at the same time as weeding. Men or husbands in the family often do it. - In the case of hired labour UGX 500 to UGX 600 is charged per spray pump, and spraying an acre may require up to Four (4) ordinary pumps. - After spraying, there is always a second weeding, and this takes the same costs and participation as the first weeding. It was noted that weeding and spraying might be carried out 3 to 4 times, depending on how the farmer prepares the garden.
	Harvesting	- Youth - Women	Basic harvesting skills	Women and youth mostly do the harvesting. Whenever family labour is not used to harvest, payments for hired labour are determined according to basins, kilograms, or sacks (100kg sacks) harvested. A basin of cotton is harvested for Ugx 5,000, whereas a kilo is harvested for Ugx 150 to Ugx 200.
	Storage	- Men - Youth - Women	Basic storage skills	- It was noted that there is a problem of lack of storage facilities which causes farmers to incur losses. - Cotton is stored when it is dry. - Immediately after harvesting, individuals store the cotton at their homes. - Basic storage skills are required, and anyone can acquire them. - Due to the challenges of storage, participants suggested that the government establish communal storage facilities.
	Middlemen (Selling to middlemen)	- Youth (Male youth) - Men - Women (1.2 women out 10 middlemen) = 12% women participation.	Knowledge in assessing quality. Reading the weighing machine. Price knowledge Business skills.	- Mainly done by Men and Male youth. Middlemen have storage facilities. It was noted that Men always take over from women at this stage of the value chain because even though women are primarily involved in the earlier stages of cotton farming, it's men that always determine where to sell the cotton. "*When cotton reaches harvesting, it becomes the man's cotton – Pamba bwatuuka okwatika, pamba yafuuka w'omwami*", a Baraza participant said. - Regarding where to sell cotton, some participants said the decision was made by both the wife and husband (determined as a couple). In contrast, others said it depended on one's effort in the farming process. However, they all acknowledged that men tend to be rigid when it comes to sharing money. - Small Holder Farmers' involvement in the cotton value chain tends to stop when they sell to the middlemen. Whatever happens thereafter, they are rarely involved.

Value Chain	Activities	Participation	Skills required	Other Comments
Ginning	Transportation & Offloading	- Men - Youth (Male youth) - Women	Driving skills. Offloading does not require special skills.	- Ginners collect cotton from middlemen, from where it is always kept in warehouses/stores. Sometimes it's the middlemen themselves that transport it to the ginnery. - There is the transportation of cotton at this stage which men and youth, mainly men. Women are rarely involved in transporting cotton, but they are sometimes involved in buying it. - The youth are mainly involved in loading and offloading cotton, which does not require special skills. It was noted that in Lira, northern Uganda, it is primarily the women who off-load cotton.
	Sucking	- Youth - Men - women	No special skills except physical strengths	Cotton is moved from the store to the gin (cotton gin). Youth mainly do this because it needs a lot of energy.
	Weighing	- Youth - Women - Men	Computer skills Reading skills	Here, the individual oversees the stock. Automated weighing scales are used, which are only operated with some level of skill. Computer skills are highly needed here since the machines used are automated. A certificate in computer literacy can suffice.
	Mechanics/ fitters	- Male youth (8 out of 10) - Women (2 out of 10 fitters)	Mechanical skills. Electrical skills. Computer skills.	Mechanics do repair machines at the ginnery. Formal skills acquired from University (Kyambogo or Busitema University) are required. A diploma or certificate can suffice. Electricians are also among other technical staff at the ginnery.
	Casuals (e.g., cleaners, suckers, conveyors or physical carriers, packers etc.)	- Women (60% participation) - Youth (Male youth=40%)	No special skills (always trained on the job)	- Women and male youth mostly do this. On average, a ginnery can employ between 30 to 40 casual workers. - There is dressing up of bales, stacking of the bales, and Packaging, among other activities.
Oil extraction	Mechanics and machine operating	- Youth - Women (2 out of 10) - Men	Mechanical skills.	Diploma holders do mechanics at this stage, but most acquire their training on the job.
	Oil refining	- Youth - Men - Women	Food technology skills	Food technologist from universities does this. Degree holders do the supervisory role. They must hold a minimum of a diploma in food technology.
	Casuals (cleaning, loading, cotton husk removal, packing oil)	- Youth - Women	No special skills	Mainly done by women and the youth. There is cotton cake packing, removal of cotton husks, cleaning, and loading.
	Marketing of cotton cake	- Women - Youth	Marketing skills	- There is a ready market for cotton cake. This is witnessed because even before the seed is cleaned, orders for it are available. - The sale of husks to the youth and women for mushroom growing is also made at this stage.
Value addition on Lint	Cotton wool – medical sundry	- Youth and Men (70% participation) - Women (30% participation)	Skills in Chemistry and / or pharmaceutical skills. Mechanical skills.	Cotton wool- medical sundries are made from cotton wool. This requires exceptional skills, which are always acquired at higher education institutions.

Value Chain	Activities	Participation	Skills required	Other Comments
	Textile	- Youth - Women - Men	Spinning skills Hand looming skills	- Fabric from Yarn, i.e., the making of fabric (garments) from cotton yarn. - Young ladies are always trained on the job by TEXDA- Textile Development Agency, under the Ministry of Trade, Industries and Cooperatives. TEXDA also takes on interns for the apprenticeship.
	Casuals	- Youth - Women	No special skills	Cleaning, packaging, loading and checking weights.

Source: EPRC 2021 based on Baraza discussion held on December 14, 2020

Some of the benefits of cotton growing were that it fostered diversification and livelihood enhancement: Participants shared how cotton growing had changed their lives:

"Through cotton growing, I managed to save and buy a plot of land worth Ugx 3.3 million." A cotton farmer from Bugambo Iganga."

"I am part of a small group of other cotton farmers, and we have managed to diversify into livestock business (cattle business) out of the money we acquire from cotton farming". A cotton farmer from mayuge

Other farmers shared how they have been able to pay school fees for their children, build decent houses and live decent lives because of cotton farming.

4.2.3 Challenges and opportunities

The challenges in the sector include:

Political restraints due to information asymmetry: The participants in the cotton value chain Baraza revealed that politicians, particularly parliamentarians, have not fully appreciated cotton as a lucrative crop, and as a result, they tend to fight cotton growing in the community. It was thus suggested that there is a need by the CDO to engage and sensitise politicians on the benefits that accrue from cotton farming.

CDO announces cotton prices late: Farmers expressed concern that there is always a delay in announcing cotton prices - which affects them and consequently results in losses as they always get stuck with their Cotton after harvesting. The delay is because the local price highly depends on the international price, which CDO has to wait to announce to farmers after an agreed-upon position between CDO and the ginners. This lack of a price assurance mechanism has also contributed to low production and poor quality.

"The price of cotton is announced late, and it is also very low, thus no longer attractive for other farmers to produce cotton. We need to also participate in those meetings where price setting is discussed because we are most affected," A cotton farmer from Kaliro."

Non-functional or missing cotton farmer associations: There are no cotton farmers associations in the country - implying that farmers are not fully represented in the cotton dialogues where pricing decisions are made. As such middlemen always buy from them at a lower price. But cotton prices tend to stabilise around October and November of every year, as reported by a cotton farmer from Kaliro. The failure of cotton associations was because farmers had different needs and challenges. This implies that they always do not agree on a common cause, mainly when to sell and at what price. Further, there is a negative attitude and lack of trust in cotton among farmers. This is so because the ginners who used to facilitate the associations by providing inputs on credit started withdrawing, which led to the collapse of these associations.

Non-functioning cotton cooperative unions: Apart from Northern Uganda, there are no cotton growers' cooperatives in the rest of the country. In Northern Uganda, such cooperatives exist and are fully operational in East Acholi and West Acholi. In such cases – ginners freely buy from any farmer, and the farmers are also free to sell to any ginner of their choice. The Busoga growers' cooperative union collapsed mainly because of mismanagement.

Cotton wilt disease: Farmers reported that the cotton wilt disease stunts the cotton crop and consequently affects their yields. They noted that the government had not helped them to curb the disease and ginners no longer wanted to give them disease-resistant cotton seeds on credit.

"Besides the very low cotton price, we have a disease that affects the cotton stalks. The disease stunts the cotton crops, and they eventually end up not yielding, whereas others dry prematurely from the garden". A cotton farmer from Nambale – Lugonza, Iganga.

Opportunities available for investments:

- *Invest in hand looming:* Besides the numerous challenges highlighted by the participants, they also noted that cotton presents innumerable opportunities for the youth and women, especially in hand-looming. It was also pointed out that the youth and women can also engage in mushroom growing to entirely use all the cotton by-products generated on the farm.
- Investment in capacity building and training in Business skills: Opportunities exist to teach smallholder cotton farmers basic business skills to help them run their cotton farming as small businesses. This may integrate post-harvest handling and management components, safety training for handling pesticides and herbicides, and other cotton agronomic practices. The training programmes can adopt a social finance model that attracts private capital and donor funding.
- Provision of spraying services and fertiliser application as a business – The youth can take this up as an economic activity that supports farmers to get timely and efficient agrochemical spraying and fertiliser application services. This will require investments in the appropriate protective gear, safety and health precaution training and linking spray service providers with agro-input dealers.

4.3 How much is the operating environment supportive for the cotton stakeholders?

Cotton trade, like fish, is well articulated in various agreements Uganda is a party to through bilateral or multilateral partnerships. Box 2 highlights the latest discussions on the cotton trade and the resolutions.

Box 2: Trade in cotton: negotiations and dedicated discussions

Negotiations to reform trade in cotton take place in the Committee on Agriculture in Special Sessions. In addition, dedicated discussions on cotton are held twice a year for WTO members to share information on the cotton trade.

Outcome of recent negotiations

Under the December 2015 Nairobi Ministerial Decision on Cotton, developed countries and developing countries committed to grant, in their respective preferential trade arrangements, duty-free and quota-free market access for exports of cotton and cotton-related agricultural products from least-developed countries (LDCs). Ministers also agreed that the decision to abolish agricultural export subsidies, as contained in the Nairobi Decision on Export Competition, would be implemented regarding cotton immediately by developed countries and not later than January 1, 2017. Insights into the 2015 Ministerial decision on cotton indicate that removing subsidies would reduce cotton production among the top-producing countries, reducing their export earnings while increasing both production and export earnings in the EAC (Munu and Shinyekwa, 2018).

The Nairobi decision also acknowledges the efforts made by some WTO members to reform their domestic cotton policies, but emphasizes that more efforts are needed. Finally, ministers also agreed in Nairobi to extend the transparency and monitoring process of trade in cotton initiated at the Bali Ministerial Conference.

Dedicated discussions on cotton

Dedicated discussions on cotton are held in the context of the Committee on Agriculture in Special Session. They rely on information compiled by the WTO Secretariat from notifications and other information provided by WTO members. The discussions do not constitute a negotiation process but are important in complementing negotiations on this topic.

These dedicated discussions are an outcome of the December 2013 Bali Ministerial Conference, where ministers agreed "to enhance transparency and monitoring in relation to the trade-related aspects of cotton" They also decided "to hold a dedicated discussion on a bi-annual basis in the context of the Committee on Agriculture in Special Session to examine relevant trade-related developments across the three pillars of Market Access, Domestic Support and Export Competition in relation to cotton".

In the December 2015 Nairobi Ministerial decision on cotton, WTO members committed to continue holding dedicated discussions on cotton biannually and to monitor the implementation of the decision.

Source: Ministerial Decision of 19 December 2015: WT/MIN (15)/45 — WT/L/980

The operating environment in the cotton value chain in Uganda is more robust at the export level when cotton is transformed into textile and less at production. For example, at the regional level, the **EAC-EU Economic Partnership Agreement** (EPA) entered in 2007 assures a steady removal of quotas and duties over 25 years. It provides quota- and duty-free access for EAC imports to the EU; rules for settling trade disputes; and new and broadened rules of origin for clothing, fishing, and farming. **There is also the EAC–US trade and investment partnership agreement in which** Uganda, as an EAC member state, enjoys duty-free access to the US market for a wide range of commodities, including Uganda exporting lint cotton and textiles, under the African Growth and Opportunity Act (AGOA). However, most EAC member states are not complying with the AGOA agreement. The 2015 **EAC, COMESA and SADC tripartite arrangement** is yet to be ratified by member states before it can come into effect. The partnership is yet to materialise as it will foster the free movement of persons across members and hence boost employment/job search across member states. COMESA secretariat believes that developing the intra-regional cotton-to-clothing value chain can contribute to the region's socio-economic and sustainable environmental development. This intervention can achieve full and productive employment and decent work for all, including women and young people (Arnell, 2016), promote gender equality and empower women along the entire value cotton-to-clothing value chain. All these partnerships include the free movement of goods, services, labour, and capital.

At the national level, the delay by policymakers to enact a comprehensive bio-safety law has restricted cotton farmers from applying technology such as growing GMO cotton, which has great potential to improve their livelihoods. The government, through NARO, is responsible for seed multiplication and the generation of developing varieties that are resistant to the cotton wilt disease. The CDO plays a role in liaising with farmers and NARO in supplying suitable varieties to farmers that have been developed.

In conclusion, enforcing the policy environment in the cotton value chain is still fragmented. More focus is on the value chain's export (low stream) end and less on the production and ginneries stage (high and mid-stream). Supervisions and standards are still not given high regard in the activities chain. This has affected the industry's growth and discouraged more investments in production and at the ginning stage for further value addition in Uganda. This also translates into potential jobs lost for many young persons and women.

5. CONCLUSIONS AND POLICY ACTIONS

5.1 Conclusions

Uganda aims to create productive and decent employment for Ugandans, especially the women and youth at a higher risk of being underemployed and unemployed. The rationale is to identify the most opportune job creating stages for women and the youth, skills and technologies required, and the investment gaps. Therefore, this study provides synthesised evidence on two commodities, fish and cotton, by understanding their value chains. Furthermore, the study sheds light on the nature of the environment that the value chains operate and what needs to be done to foster viable investments identified. The limited secondary data available, especially for the cotton sector, led to using qualitative findings from Baraza forums held on each commodity to augment the desk reviews and secondary data analysed.

Data from the Uganda Bureau of Statistics suggest that fish and cotton contribute greatly to agricultural GDP and earn relatively high export revenues after coffee. In addition, since 2014, fish has employed, on average, about 64,270 Ugandans distributed within different fish varieties at the production stage alone (fishing). At the production stage of the value chain of the fish sector, males dominate (about 99 percent). After this stage, more women and youth participate, with the level of involvement varying depending on the fish variety. This study focused on the three most traded (domestic and foreign) fish varieties for an in-depth analysis of their value chains. These included: Silver fish (*mukene*), Nile Perch (Mpuuta) and Tilapia (Ngege). With support from literature and a fish Baraza meeting, the potential value chains were identified as well as the corresponding employment opportunities, skills and technologies required, plus the investment opportunities available.

Findings reveal that fish value chains are heterogeneous, with the Nile Perch value chain being more complex than

that for silver fish and Tilapia. In addition, it is Tilapia that can only be farmed in cages (aquaculture). Regarding employment, immense employment opportunities exist, especially in the silver fish value chain for women (over 90 percent participation) after the production phase in processing (value addition such as salting, deep frying and sun drying) and marketing. In contrast, youth (male) have potential employment in the Nile Perch and Tilapia value chains, given the intensity of work required. Nonetheless, according to the qualitative findings, employment in the fish value chain required relatively low skills -with soft skills being more relevant than technical skills (acquired from a training college). While elementary, the jobs can be even more productive and decent if technologies in higher value processing stages of the value chains are leveraged. One of the major challenges beyond the high initial investment costs in appropriate technologies is the aspect of monitoring and adhering to standards.

Findings on the cotton value chain were straightforward, as this did not depend on cotton varieties. Like fish, the potential for youth and women employed in the cotton value chain is concentrated at the production/farming stage and the ginneries when cotton is separated from the seed. This activity requires a lot of patience and care, and women and female youth (60 percent) occupy these positions. More adult and young males are involved in higher-skilled jobs such as mechanical, computerised and transportation. Cotton requires more sophisticated skills, technologies, and investments for value addition to occur at the lower-stream end of the value chain. Baraza discussions revealed limited government involvement in supporting farmers through inputs provision, unlike other cash crops like coffee and tea. In addition, cotton cooperatives collapsed; hence, a unified body for cotton farmers is non-functional; therefore, critical issues such as cotton price settings are done without farmers' voices. Despite some of these challenges, opportunities to invest in hand looming, which relatively requires low investment costs are available through which more productive and decent jobs for youth and women can be created.

Based on these findings, the following policy actions are recommended for each fish and cotton value chain aimed at job creation in Uganda.

5.2 Policy actions

Regarding fish:

i. For Tilapia, increased investments in cage farming should be encouraged. To ensure that such interests are made, government must provide special skills training programmes to equip fish farmers in cage farming technologies and maintenance. These skills may be acquired through different ways, such as the development of manuals and materials in formats that are appropriate for persons who are illiterate and produced in various local languages for the youth and women to interpret and put into practice.

ii. For increased value addition, the government should avail support of investment in new smoking technologies such as cancer-free smoking kilns and solar tent driers for drying fish (e.g., Mukene) in bad weather. In addition, for Nile Perch fish, there is a need to streamline the fish maw business with an emphasis on value addition domestically.

iii. Female youth should be trained in the marketing of fish at all stages. Training in communication skills plus practical exposure to marketing. Training of the youth and women in group dynamics. Fish handling skills right from fishing on the waters to ensure quality fish that can fetch a high price on the market. There is a need to prioritise the fish by-products that are always wasted. More jobs will be created if well managed, and value is added through factories.

iv. Fish handlers need to be organised to get the market instead of using middlemen. For example, licensing and organising the fish maw traders into associations. An appropriate market for the fish maw should be set in such clear associations.

v. Because most of the youth are interested in quick money, there is a need for sensitisation to change their mindset.

Regarding cotton:

i) Farmers should be fully consulted and involved in determining the price of Cotton. The current cotton price is very low and no longer attractive. The price of cotton should be more transparent and communicated on time.

ii) There is a need for government support and

engagement, primarily through the provision of cotton seeds, since ginners are becoming less interested in doing so.

iii) Value addition should be prioritised since it was noted that there are increases in returns as more value is added onto cotton, i.e., cotton lint (1.4 dollars), yearn (3 dollars), fabric (5 dollars) and T-shirts (12 dollars). Furthermore, support investment through financial support in the hand-looming stages of the cotton value chain.

iv) Political economy question! There is a need to engage with politicians to obtain buy-in and acceptance of cotton farming and production in the cotton farming regions.

i) Revive farmers' cotton associations and cooperatives. The collapse of cotton associations greatly affected the prices. This is because long before associations existed, it was straightforward for the ginners to support the farmers through their associations. Ginners used to extend advances to farmers in instances when price announcements could delay. This was an excellent motivation for the farmers.

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